REMARKS

The Applicants thank the Examiner for the thorough review and consideration of the pending application. The Office Action dated April 17, 2009 has been received and its contents carefully reviewed.

Claim amendments

Claims 1-7 and 10-12 were previously pending in the application. Claims 1-3 are amended and claims 4-7 and 10-12 are canceled. Claim 1 is amended to include the subject matter of claim 6 and to include a lower limit for the plane orientation coefficient. Support can be found at least in Table 1 on page 24 of the application as filed.

Rejection under 35 U.S.C. §103

The Office Action rejects claims 1-7 and 10-12 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,900,325 issued to OKAMURA et al. (hereinafter "OKAMURA") in view of JP 2003-18734 (hereinafter "YAMANAKA") and JP 2000-158588 (hereinafter "IWASA"). The Applicants respectfully traverse the rejection.

The primary object of the present recited invention is, as was set forth in Applicant's Paper filed 3/16/2009, to provide a steel-made easy open end which achieves both openability and elimination of repair lacquering (no occurrence of breaking of film) even with a thin score residual thickness, and to provide

also a steel-made easy open end which has excellent blushing resistance during retorting (specification, from p.3, line 23 to p.4, line 4).

Further, the present recited invention concurrently has a feature, namely, the easy open end is hard to generate film break even in the case of lid-forming after the heat treatment step such as baking finish and heat transfer printing (specification, p.14, lines 8-13).

Claim 1 is amended to more clearly bring forth these features and to recite the necessary conditions to achieve the whole foregoing properties.

Specifically, in order to secure a feature of being hard to generate film break even in the case of lid-forming after the heat treatment step, it is important to use a copolyester resin film having between about 0.04 and 0.01 orientation coefficient wherein the copolyester resin having about 94 to about 98% by mole is a terephthaloyl component (specification, from p.14, line 8 to p.16, line 2 from bottom).

The position set forth in the Official Action is that the present invention would have been obvious over OKAMURA, YAMANAKA and IWASA.

This position is in spite of the Official Action recognizing that the conditions of "0.04 or smaller plane orientation coefficient" and "a copolyester resin having about 94 to about 98% by mole being a terephthaloyl component" are not

clearly disclosed in OKAMURA. The Examiner suggests that these two necessary conditions are taught by IWASA.

However, IWASA does not suggest these features as evidenced by the below counterarguments, concerning the two necessary conditions, by examining the disclosure of IWASA.

The analysis of IWASA set forth in the Official Action is that IWASA teaches copolyesters with a plane orientation coefficient of less than or equal to 0.15 with the copolyester having about 94 to about 98% by mole of a polybasic acid components being a terephthaloyl component.

Nevertheless, when Table 1 in paragraph [0068] of IWASA is examined, the values of all plane orientation coefficients cover merely from a minimum value of "0.114 (Inventive example 4)" to a maximum value of "0.157 (Comparative example 2)". This is because, we presume that, with the method disclosed by IWASA, there can be obtained a film of about 0.114, at the very most, as a minimum value of a plane orientation coefficient. At any rate, IWASA teaches a copolyester in which a plane orientation coefficient is 0.114 or larger (0.157) and wherein 94 and 99% by mole (Comparative example 1: 87% by mol) of a polybasic acid components is a terephthaloyl component. IWASA does not disclose a plane orientation coefficient of between about 0.04 and 0.01 as required of the present invention.

The reason that IWASA does not disclose or suggest the recited range is because in the film according to IWASA, a

polyester consisting mainly of ethylene terephthalate is necessary to be biaxially extended (paragraph [0021]). Further, there is set out in paragraph [0028] that a non-extended sheet is extended in the lengthwise and widthwise directions of a film and heat treated and thereby a film having objected plane orientation degree is obtained. Also, as an extension ratio, there are set forth 1.6 to 4.2 times, preferably 1.7 to 4.0 times, at each direction. It is common knowledge of a person skilled in the art that when a non-extended sheet is extended, the plane orientation coefficient of a film increases.

Thus, one of ordinary skill in the art would understand the method underlying the device of IWASA could not or at the very least would be extremely hard to obtain a plane orientation coefficient of between about 0.04 and 0.01. Therefore, IWASA would not lead one of ordinary skill in the art to a plane orientation coefficient of between about 0.04 and 0.01.

The reason why the present invention is able to obtain a film having a polyester resin film having "between about 0.04 and 0.01 plane orientation coefficient" wherein "the polyester resin is a copolyester in which about 94 to about 98% by mole is a terephthaloyl component" is disclosed in the specification from p.14, line 18 to p.16, line 2 from bottom, and the essential point set for the below.

That is to say, by heat treatment such as baking (normally, 180 to 230°C or thereabout), crystals called the

spherulite grow inside a film to deteriorate the formability. The formation of spherulite becomes significant for the polyester closer to a homopolymer and therefore, in the present invention, by setting the percentage of the terephthaloyl component to about 98% by mole or smaller, the formation of the spherulite is effectively suppressed.

On the other hand, generally speaking, reduction in the resin thickness by forming decreases the strength, which induces the tendency of easily breaking the resin by shearing force. Likewise, a resin which is subjected to forming tends to increase the strength owing to the work-hardening.

Accordingly, it was expected that a resin which shows a large degree of work-hardening tends to be hard to induce reduction in strength even after being extended. For a polyester, since the extensibility depends on the plane orientation coefficient, the one which has smaller plane orientation coefficient is more preferred. From these viewpoints, the present invention specifies the plane orientation coefficient to 0.04 or smaller. The hardenability by forming becomes larger when the component percentage of copolymer resin becomes closer to the homopolymer. Therefore, the above described percentage of terephthaloyl component is specified as about 94% by mole or larger considering the above findings.

Therefore, the present inventors looked to a method underlying the present invention for obtaining an easy open end,

comprising a polyester resin film having about 5 minutes or shorter half crystallization time and between about 0.04 and 0.01 plane orientation coefficient, wherein the polyester resin is a copolyester in which about 94 to about 98% by mole is a terephthaloyl component, that is dissimilar to the manufacturing method underlying IWASA of using a biaxially extended film.

As explained in the specification from p. 10, last line to p.11, line 12, an example of the method to prepare that type of steel sheet is the one which forms a polyester film having about 0.04 or smaller plane orientation coefficient on the steel sheet by pasting, adhering, heat lamination, or the like. Another applicable method is the direct-laminating method in which resin chips are melted and are directly extruded onto the steel sheet without extending. Further example method is the one which forms a polyester film having larger than about 0.04 of plane orientation coefficient on the steel sheet while the plane orientation coefficient is adjusted under thermal fusion to between about 0.04 and 0.01.

As set forth above, it was generally known that when a non-extended sheet is extended, the plane orientation coefficient of a film increases. Thus, the method underlying the present invention was contrary to accepted methods.

According to the method of the Inventive example of the present invention, in order to laminate a polyester film onto a steel sheet, the sheet is subjected to heating to a temperature

in a range from 30°C above the melting point to 50°C below the melting point, which is followed by pressing and cooling by lamination rolls to conduct lamination (specification, from p 19, line 16 to p. 20, line 1).

An easy open end of the present invention, comprising a polyester resin film having between about 0.04 and 0.01 plane orientation coefficient, wherein the polyester resin is a copolyester in which about 94 to about 98% by mole is a tarephthaloyl component, has a characteristic in that, the easy open end is hard to generate film break even in the case of lid-forming after the heat treatment step such as baking finish and heat transfer printing. Please refer to Table 1 of the specification of the present application.

Samples of Inventive examples 1 to 5 have 94 to 96% by mole of a terephthaloyl component and a plane orientation coefficient of 0.01 to 0.04 and these values satisfy the necessary conditions of claim 1. When looking at the column of "With baking" in the column of "Corrosion resistance" in Table 1, the whole samples are evaluated as ""Excellent" or "Good" and from this it is understood that there can hardly be generated film break even in the case of lid-forming after the heat treatment step. On the other hand, Inventive example 8, wherein the terephthaloyl component in the copolyester is 99% by mole, corresponds to an easy open end of IWASA and even if a plane orientation coefficient is between about 0.04 and 0.01, the

evaluation of corrosion resistance with "With baking" will be no more than "Fair".

Similarly, other Inventive examples and Comparative examples, even when the terephthaloyl component in the copolyester is 100% by mole (Inventive examples 6 and 7) or in a case of less than 94% by mole (Inventive example 9; Comparative examples 1 and 2), sufficient corrosion resistance is unable to be obtained.

In view of this, it is apparent that IWASA does not recognize the relationship between the plane orientation coefficient and the terephthaloyl component % that would lead one of ordinary skill to the invention of claim 1.

Accordingly, when the claimed invention is viewed as whole including the method underlying the present invention, the present invention can hardly be arrived by the combination of OKAMURA and YAMANAKA with IWASA, and in this respect, the rejection of the present invention as being lack of inventive step is untenable.

Accordingly, the teaching of OKAMURA in view of YAMANAKA and IWASA fails to render the claimed invention obvious.

For at least the aforementioned reasons, the Applicants respectfully submit that claim 1 is patentably distinguishable over OKAMURA in view of YAMANAKA and IWASA. Likewise, the claims which depend from claim 1, are also patentable for at least the same reasons. Accordingly, Applicants respectfully request the

35 U.S.C. §103(a) rejection of claims 1-7 and 10-12 over OKAMURA in view of YAMANAKA and IWASA be withdrawn.

Entry of the above amendments is earnestly solicited. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

This response is believed to be fully responsive and to put the case in condition for allowance. An early and favorable action on the merits is earnestly requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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